

WHAT IS CLAIMED

1 1. A high capacity broadband base station for a  
2 cellular communication system comprising a phased array  
3 antenna coupled with a wideband radio having an operational  
4 bandwidth that contains all channels of said system.

1 2. A high capacity broadband base station according  
2 to claim 1, wherein said phased array antenna comprises a  
3 multi-dimensional distribution of antenna elements,  
4 respective sets of which are coupled with respective  
5 wideband radios, each of which has said operational  
6 bandwidth.

1 3. A high capacity broadband base station according  
2 to claim 2, further including a processor coupled to said  
3 wideband radios and being operative to controllably define  
4 a narrow beam of said phased array antenna.

1 4. A high capacity broadband base station according  
2 to claim 2, further including a processor coupled to said  
3 wideband radios and being operative to generate amplitude  
4 and phase weighting coefficients for defining transmit and  
5 receive directivity patterns for said phased array antenna.

5. A high capacity broadband base station for a cellular communication system comprising a wideband radio coupled to a phased array subsystem, said phased array antenna subsystem containing multiple sets of alternating receive only and transmit/receive antenna elements distributed in a two dimensional spatial array, and wherein said digital wideband radio is operative to perform both receive and transmit channel signal processing, such that in the receive direction, the digital representation of the entire spectrum for each antenna element is divided into channels for a particular waveform of interest, and in the transmit direction, said wideband radio is operative to combine digital representations of individual channels into a single wideband channel for transmission.

1 6. A method of increasing the capacity of broadband  
2 base station for a cellular communication system comprising  
3 the steps of:

4 (a) providing a phased array antenna having a multi-  
5 dimensional distribution of antenna elements; and

6 (b) coupling respective sets of antenna elements of  
7 said phased array antenna with a wideband radio having an  
8 operational bandwidth that contains all channels of said  
9 system.

1 7. A method according to claim 6, wherein step (b)  
2 comprises coupling respective sets of said multi-  
3 dimensional distribution of antenna elements with  
4 respective wideband radios, each of which has said  
5 operational bandwidth.

1 8. A method according to claim 7, wherein step (b)  
2 further comprises controllably defining a narrow beam of  
3 said phased array antenna.

1 9. A method according to claim 7, wherein step (b)  
2 further comprises generating amplitude and phase weighting  
3 coefficients for defining transmit and receive directivity  
4 patterns for said phased array antenna.